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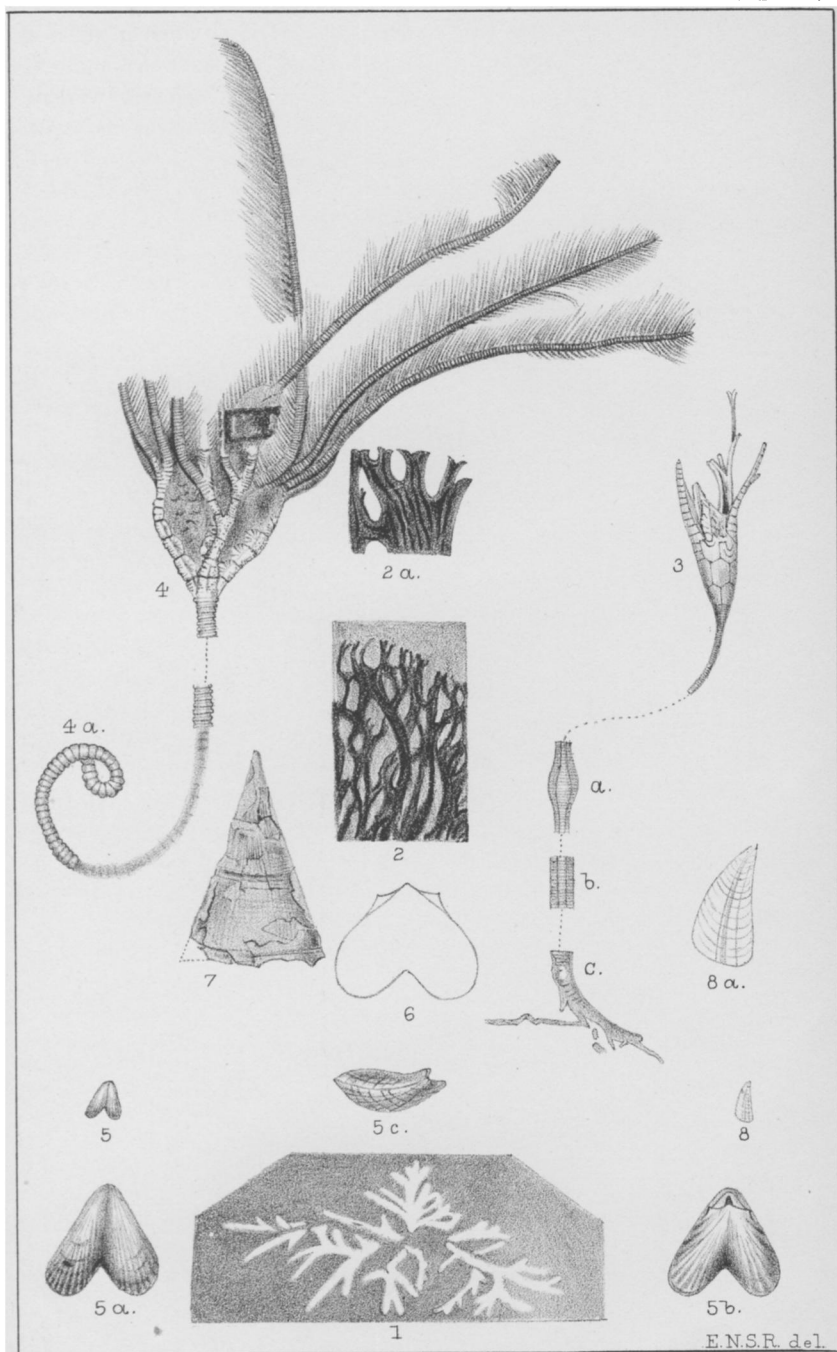
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Ringueberg, Fossils from Niagara Shale.

SOME NEW SPECIES OF FOSSILS FROM THE NIAGARA SHALES  
OF WESTERN NEW YORK.

BY EUGENE N. S. RINGUEBERG M. D.

In the following descriptions of seven new species from this vicinity will be found representations from the three divisions of the Niagara Shale including three genera which I believe to be new to the Niagara of this State i. e. *Mariacrinus*, *Hyalolithes*, and *Plumulites*. The specimens were all collected at Lockport and the types are in my collection.

***Buthotrepis gregaria***. (n. sp.) Pl. VII, fig. 1.

Plants small, gregarious, each separate plant growing in an irregularly radiating manner from a central point, commencing in several original trunks which rapidly branch out without any system or observable regularity, by bifurcations and lateral shoots. Diameter of the radiating fronds as spread out, from two to three and at times four c. m. It is however hard to get accurate measurement on account of the habit of this fucoid of growing in little clumps containing many individual plants, whose branches often interlace in a confusing manner. Its growth in different directions is rather irregular; sometimes one branch seems to out-grow all the rest, or again two opposite will spread out till the plant is twice as wide in one direction as in the other. The radiate arrangement, however, seems to be quite constant. Thickness of the branches averages about one millimeter.

This curious little fucoid is readily recognized by its radiate growth, which together with the size of the branches seems to be quite invariable—and also by its habit of growing in little clumps, occasionally specimens may be found which seem to grow upon the branches of some of the stouter fucoids; such as *Buthotrepis gracilis* var. *crassa*, Hall.

Found in the harder shale bands from the middle third of the shale at Lockport N. Y.

***Inocaulis anastomotica*** (n. sp.) Pl. VII, fig. 2.

Frond flabelliform or possibly circular or cyathiform in the perfect state.

It is composed of large coarse branches, the principal ascending ones of which are from two to three millimeters in width, with smaller lateral branches and tips. Whole frond united by frequent

anastomoses into an irregular network. The branches seem to anastomose as frequently by the growing towards each other of two adjacent branches; these unite whenever they chance to meet into a common branch, which grows upwards and bifurcates as before; as by the more slender diagonal connecting filaments.

By reason of this peculiar mode of growth no single branch can, as a rule, be traced for any considerable distance as maintaining its identity, for as it bifurcates each bifurcation is often met by that from the adjoining two branches and they, by uniting, form a single branch; at the outer margin the branches taper down and terminate in from two to more sharp points, or serrations.

Surface of the branches marked by strong, irregular longitudinal wrinkles, which at times seem to assume a semi-scabrous character. Margins of branches rarely present a slight serration or roughness; and in places where portions of the black corneous branches have scaled off the cast shows the obverse side to have the same character as the other.

The openings in the network are of various sizes and shapes but mostly oval or fusiform, no two being alike.

The type specimen presents about one third of the circumference of a circle and measures nine c. m. from the margin to as near the center as is preserved and which judging from the angle of radiation of the branches could not be more than one c. m. further.

There is some hesitancy in placing this species in this genus because all the forms which we are acquainted with are rather loosely branching with few if any anastomoses or reticulations. Still the character of the branches so closely resembles those belonging to this genus that I am constrained to place it here.

From the lower third of the shale at Lockport ranging as high as the *Homocrinus* band.

Only two fronds have been found in which the margin is preserved, and both seem to represent portions of a quite regular circle.

***Dendrocrinus oelsus*** (n. s. p.) Pl. VII, fig. 3.

Calyx elongate, cylindrical, slender, quite evenly tapering from the insertion of the brachials to the base which is of the same size as the last joint of the column.

Height to top of first radials seven millimeters. Width of base two millimeters. Width of top of calyx not quite six millimeters. Arms branched, without pinnules. Under-basals much higher than

wide, slightly arched transversely giving the base of the calyx a moderately pentagonal form which is shared by a few of the upper joints of the column.

Basals long.

First radials wide and short with a deep horse-shoe shaped articular facets in the center of the upper margin which arches strongly outward to conform to this facet which is directed upward and outward for the reception of the brachials. These are about eleven in number before any bifurcation takes place. One ray is observed to bifurcate twice above this point. Only the anterior sides is as yet known.

Column round, long, thick in its lower portion where it is quinque-partite; it gradually tapers as it ascends till within a short distance below the calyx where it is less than half of its original thickness, and here its quinque-partite character disappears; and it continues of the same thickness for some distance till within four millimeters below the cup when it again commences to enlarge, finally becoming sub-pentagonal just before reaching the calyx. Length of column twenty centimeters—diameter near base about two and one half millimeters; at a short distance below calyx about one millimeter.

Radix tapering, inclined to one side and throwing off lateral rootlets from the under half; it has been traced for about two centimeters but evidently was somewhat longer.

This species is readily distinguished from *D. longidactylus* Hall, which is found in this group by the elongated calyx with its much higher basals and underbasals also by having about twice as many brachials before the first bifurcation takes place, and by having a sharper ridge in the first series; being there much like those above the first bifurcation in the former. The peculiar character and appearance of the brachials are almost sufficient to mark it as a *Dendrocrinus*.

The calyx was carefully scaled out of its matrix but unfortunately the posterior side was found to be so crushed in as not to admit of an accurate description.

**Mariaorinus warreni** (n. sp.) Pl. VII, fig. 4.

Calyx inverted penta-pyramidal, irregularly expanding from the base to the second bifurcation of the radials, at which point it is, in the type specimen, thirteen millimeters high; angles sharp with strongly projecting, heavy, rounded carinae, the surface of which is crossed by well defined, and generally transverse, rugae.

Surface of the radial plates transversed by coarse radiating ridges of which there are four or five on both sides of the central elevation in each of the radials, surface between the ridges seems to be quite smooth, although so much difficulty was experienced in removing the adherent shale that this point could not be decided accurately. The interradial and inter-axillary plates have less prominent ridges ornamenting their surface.

Arms long, slender, of nearly equal diameter till near the tip, where they are very gradually tapering to a quite acute termination; surface smooth. Length about six centimeters, pinnules very delicate from five to seven millimeters long at the lower portion; rapidly shortening at the tip of the arm.

Column stout, as thick as the base of the calyx, at that point, from which it evenly tapers as far as it is preserved, which is about twelve centimeters, to one half its diameter at the calyx. Joints with rounded central projections, which are not quite so wide as the joint is long.

This species differs from *M. carleyi*, Hall, with which it agrees in the general size and contour of the calyx, principally in the surface ornamentation; it having a smoother surface and more numerous radiating ridges on the radial plates, and they are also thicker than in the former and the base is somewhat wider.

This specimen is from the upper third of the shale, and is associated on the same slab with the *Dendrocrinus* just described, its column lying across that of the former. This unique slab was found and presented to the author by W. H. Warren Esq. of Lockport, after whom the species is named.

***Orthis acutiloba*** (n. sp.) Pl. VII, fig. 5.

Shell bilobate, obversely cordate in outline, apex semiacute. Both valves have a deep and sharp mesial depression thus forming an acute notch in the anterior margin. Hinge line very short, terminating in small sloping auricles which are scarcely noticeable when the shell is viewed from the ventral side.

A profile view shows the ventral side to be strongly convex with the beak of that valve projecting far beyond the other and somewhat outward, while the dorsal profile is sinuous, being slightly concave immediately behind the umbo and convex anteriorly. Length and breadth each five millimeters.

Dorsal valve with umbo but slightly projecting beyond the hinge line, outer profile having an S like or line of beauty curve, with the concavity at the apical end and the convexity anteriorly; inner or marginal profile regularly convex. Area small. Ventral valve strongly convex in profile, inner profile concave; area triangular, as high as wide, with the foramen occupying one-half of its width. Surface marked by strong radiating striations which seem to increase mostly by interstriation: they are from ten to twelve to fifteen in number on each lobe at the margin. These are crossed by lines of growth which vary in distance from each other and increase in definition as they approach the margin.

This little shell belongs to the same group of orthidean forms as *Orthis biloba* Lin. Pl. VII, fig. 6. and *O. varica* Con., and when first found was regarded as an example of the former, but upon comparison with some Wolcott, N. Y. specimens it was found to differ much more from that and *O. varica* than they do from each other. The principal points of specific distinction are the more elongate outline of the shell with longer and more pronounced lobes; a deeper anterior sinus, more acute rostrum and a greater disparity between the size and curvature of the two valves; and a hinge line which is comparatively only about one-half as long as that of the species under comparison. Only two perfect specimens have been found, but occasionally a single valve is seen imbedded in the shales of the middle and lower thirds at Lockport.

Not a single individual of *O. biloba* has fallen under my observation from this vicinity.

**Hyolites subimbricatus**, (n. sp.) Pl. VII, fig. 7.

Shell conical, sides regularly sloping from acute apex, aperture about half as wide as height of shell. Surface marked by very faint and closely arranged minute longitudinal striæ, which are crossed by irregular transverse striæ placed at various distances apart, with occasional stronger lines of growth which at times take on a slightly imbricating character.

On account of the partly flattened condition of the only example thus far secured, the exact angle of divergence of the sides from each other, and the outline of the aperture cannot be ascertained.

This species bears some resemblance to *H. columnaris* of Barrande, as figured by him, but the longitudinal striæ are very much finer and more closely arranged, so that they are hardly noticeable except under a lens, and the shell is not so tapering.

**Plumulites gracilissimus**, (n. sp.) Pl. VII, fig. 8.

Plate exceedingly frail and delicate. Phylliform base broad, evenly tapering to an acute apex, curved laterally, one margin slightly concave or nearly straight, the other quite convex; this latter side is considerably shorter than the other, thus giving an upward slope to the base towards this side. Surface ornamented by a median narrow ridge which follows the same general curve as the plate and tapers to a point at the apex. On the longer half of the plate, as divided by the median elevation, there is a secondary filiform ridge or striation subdividing that portion into two equal halves; it extends from the base upwards towards the apical end, finally becoming lost before reaching it.

These two longitudinal carinæ are crossed by twelve or more transverse lines which curve downwards in the centre from the two sides towards, and having the same contour as, the margin of the base; they are equi-distant and are placed about as far apart as the width of the central elevation. Length six millimeters.

This species approaches *P. minimus* Barr., in size, but is more elongate like *P. delicatus* Barr., from which it differs in having a narrower central elevation. Its fine lateral striation which again subdivides the longer lateral half is quite distinctive.

From the lower third of the shale at Lockport only separate plates have as yet been found.

#### EXPLANATION OF PLATE VII.

- Fig. 1. *Buthotrepsis gregaria*, n. sp. One individual from the type slab.
- Fig. 2. *Inocaulis anastomotica*, n. sp. Portion of the type frond.  
 a. Terminal of a branch from another portion of the frond enlarged.
- Fig. 3. *Dendrocrinus celsus*, n. sp. Specimen with only a portion of the column represented.  
 a. Fusiform enlargement observed near the centre of the column.  
 b. Portion of column near root.  
 c. Root.
- Fig. 4. *Mariacrinus warreni*, n. sp. Calyx with a portion of the column; the rest has been omitted, except:—  
 a. The portion at its termination showing its peculiar spiral ending.



- Fig. 5. *Orthis acutiloba*, n. sp.  
a. Ventral view enlarged three diameters.  
c. Dorsal view enlarged three diameters.  
d. Profile view enlarged three diameters.
- Fig. 6. *Orthis biloba* Lin. Outline of a species from Walcott, N. Y. in my collection to show the difference in contour from *O. acutiloba*.
- Fig. 7. *Hyolithis subimbricatus*, n. sp.
- Fig. 8. *Plumulites gracilissimus*, n. sp.  
a. Same enlarged three diameters.